

SCOPE OF CLAIMS

1. A data processing system comprising an operating system which contains a file system driver and a device driver,

characterized in comprising:

a real-time interface driver which processes data of a device which comprises an interface which is required to ensure real-time processing during recording and/or reproducing;

a non real-time interface driver which processes data of a device which comprises an interface which is not required to ensure real-time processing during recording and/or reproducing;

an IFS manager which allocates instructions for predetermined processing regarding a file system to each one of control means which are to handle the instructions;

first control means which, using first file management information with respect to data which are in a first medium which is housed in the device[✓] which is required to ensure said real-time processing, ^{P60a修正 19λ} converts an instruction for said predetermined processing inputted through said IFS manager into a data processing instruction on said first medium and sends to said real-time interface driver; and

second control means which, using second file management information with respect to data which are in

a second medium which is housed in the device which is not required to ensure said real-time processing, executes processing for accessing to a file on said second medium in accordance with the instruction for said predetermined processing inputted through said IFS manager and sends the instruction for said predetermined processing to said non real-time interface driver via an I/O sub system.

2. The data processing system of Claim 1, characterized in that said first control means comprises:

a file system driver for first medium which judges whether it is necessary to access a file on said first medium based on the instruction for said predetermined processing inputted through said IFS manager and said first file management information; and

file system processing support application means which creates a data processing instruction on said first medium when an access is necessary in accordance with the judgment made by said file system driver for first medium,

and in that said file system processing support application means drives said real-time interface driver.

3. The data processing system of Claim 2, characterized in that said file system processing support application means, using information from an IFS monitor which monitors a state of an instruction for predetermined processing which is handled by said IFS manager, creates a data processing

instruction on said first medium.

4. The data processing system of Claim 2, characterized in that said file system driver for first medium comprises:

a file management information holding part which stores said file management information;

a identifying part which receives an instruction from said IFS manager and identifies said instruction;

a file entry extracting part which extracts a file entry corresponding to a file name from said file management information holding part when said instruction is OPEN, registers in an access file entry holding part, and sends said instruction to said file system processing support application means;

a second file information extracting part which retrieves information regarding a file which is designated by said access file entry holding part based on a file ID received together with said instruction when said instruction is READ, WRITE or CLOSE, adds the information to said instruction, and sends to said file system processing support application means; and

a first file information extracting part which retrieves information regarding a file which is designated by said access file entry holding part based on said file ID received together with said instruction when said instruction is an instruction except for OPEN, READ, WRITE

and CLOSE, and sends to said IFS manager through said identifying part.

5. The data processing system of Claim 3, characterized in that said file system processing support application means comprises:

a support processing judging part which determines a content of processing based on information from said file system driver for first medium and information from said IFS monitor and instructs; and

a copying part which executes copying processing in accordance with the judgment made by said support processing judging part.

6. The data processing system of Claim 3, characterized in that said first file management information is recorded on said first medium,

and said file system processing support application means comprises a file management information updating/acquiring part which is for reading said first file management information from said first medium or for writing on said first medium in accordance with the judgment made by said support processing judging part.

7. The data processing system of Claim 5 or 6, characterized in that said file system processing support application means further comprises a random access processing part which

receives an OPEN, a CLOSE, a READ and a WRITE instructions other than instructions which are related to copying processing,

when said instruction is an OPEN instruction or a CLOSE instruction, receives said instruction and information regarding a file which is designated,

and when said instruction is a READ instruction or a WRITE instruction, receives and processes information regarding which portion of said file is demanded by said instruction, in addition to said instruction and said information regarding a file which is designated.

8. A data processing system comprising an operating system which contains a file system driver and a device driver,

characterized in comprising:

display application means which displays files which can be handled in a file system, selects a desired file from the displayed files, and starts processing which is associated with said selected file;

a first processing part which executes processing on a first medium which stores data of a device which comprises an interface which is required to ensure real-time processing during recording and/or reproducing;

a second processing part which executes processing on a second medium which stores data of a device which

comprises an interface which is not required to ensure real-time processing during recording and/or reproducing;

device identifying means which identifies a device in which said selected file exists; and

a file starter part which drives said first or said second processing part in accordance with the identification result made by said device identifying means.

9. A data processing system comprising an operating system which contains a file system driver and a device driver,

characterized in comprising:

a real-time interface driver which processes data of a device which comprises an interface which is required to ensure real-time processing during recording and/or reproducing;

a non real-time interface driver which processes data of a device which comprises an interface which is not required to ensure real-time processing during recording and/or reproducing;

an IFS manager which allocates instructions for predetermined processing regarding a file system to each one of control means which are to handle the instructions;

first control means which, using first file management information with respect to data of the device which

comprises an interface which is required to ensure said real-time processing which are stored in a first medium, converts an instruction for said predetermined processing inputted through said IFS manager into a data processing instruction on said first medium and sends to said real-time interface driver; and

second control means which, using second file management information with respect to data of the device which comprises an interface which is not required to ensure said real-time processing which are stored in a second medium, executes processing for accessing to a file on said second medium in accordance with the instruction for said predetermined processing inputted through said IFS manager and sends the instruction for said predetermined processing to said non real-time interface driver via an I/O sub system;

display application means which displays files which can be handled in a file system, selects a desired file from the displayed files, and starts processing which is associated with said selected file;

a first processing part which executes processing on a first medium which stores data of a device which comprises an interface which is required to ensure real-time processing during recording and/or reproducing;

a second processing part which executes processing on a second medium which stores data of a device which

comprises an interface which is not required to ensure real-time processing during recording and/or reproducing;

drive identifying means which identifies a drive in which said selected file exists; and

a file starter part which drives said first or said second processing part in accordance with the identification result made by said device identifying means.

10. The data processing system of any one of Claims 1 through 9, characterized in that said real-time data are video data.

11. A medium which can be processed on a computer and which carries a program and/or data for making a computer execute all or some functions of all or some means according to any one of Claims 1 through 10.

12. An aggregation of information which is a program and/or data for making a computer execute all or some functions of all or some means of the invention according to any one of Claims 1 through 10.

13. A data transmission apparatus, comprising:
time intervals generating means which creates predetermined time of day information;

outputting means which outputs a series of data frames

as stream data;

sending means which divides said series of data frames

forming said stream into packet data and sends; and
transmission managing means which manages said
outputting means and said sending means,

characterized in that said transmission managing
means enters said stream data to said sending means based
on said predetermined time of day information.

14. The data transmission apparatus of Claim 13,
characterized in that said time of day information is set
up to correspond to necessary timing which is needed by
an apparatus which receives packet data of said series of
data frames.

15. The data transmission apparatus of Claim 14,
characterized in that said necessary timing is based on
a frame frequency of said series of data frames.

16. The data transmission apparatus of any one of
Claims 13 through 15, characterized in that said
transmission managing means provides said time intervals
generating means with a correction instruction which is
for correcting said predetermined time of day information
in accordance with a condition of burden upon said sending
means,

and said time intervals generating means creates said
predetermined time of day information without receiving
the correction instruction or considering the correction
instruction.

17. The data transmission apparatus of any one of Claims 13 through 15, characterized in that said transmission managing means does not provide said time intervals generating means with a correction instruction which is for correcting said predetermined time of day information in accordance with a condition of burden upon said sending means.

SUB A17 18. The data transmission apparatus of any one of Claims 13 through 17, characterized in that said predetermined time of day information time is expressed as groups of the start time and the end time of said data frames.

19. The data transmission apparatus of any one of Claims 13 through 18, characterized in that said stream data are data for a digital VCR for consumer use.

20. The data transmission apparatus of any one of Claims 13 through 19, characterized in that said sending means sends said stream data to a digital VCR for consumer use.

21. The data transmission apparatus of any one of Claims 13 through 20, characterized in that said outputting means reproduces data for a digital VCR for consumer use.

22. A data transmission apparatus, comprising:
data conversion means which divides inputted stream data and adds header information to each piece to thereby

obtain packets, and inserts packet processing start time information which is for the data receiving side into the header information of at least first packet of each frame of said stream data and thereafter outputs; and

an interface which, using a clock, outputs to a bus the packets processed by said data conversion means, at the transmission start time which corresponds to said packet processing start time information,

characterized in that the packet processing start time information of said packets is expressed by:

$$T1 = X + Z + Y (N - 1)$$

(where $X \geq 0$, $Z \geq 0$) assuming that X denotes the transmission start time for the first packet of the first frame, N denotes a frame number, Y denotes a frame period, Z denotes an initial value, and T1 denotes the processing start time of said packets.

23. The data transmission apparatus of Claim 22, characterized in that said bus is an IEEE1394 bus, and said interface is an IEEE1394 interface.

24. The data transmission apparatus of Claim 22 or 23, characterized in that said stream data are data for a digital VCR for consumer use, said Z is a value around 250 microseconds, and said Y is a value which is based on a frame frequency of said stream data.

25. A medium which can be processed on a computer and

SWA 187

Sub A18

which carries a program and/or data for making a computer execute all or some functions of all or some means of the data transmission apparatus of any one of Claims 13 through 24.

26. An aggregation of information which is a program and/or data for making a computer execute all or some functions of all or some means of the invention according to any one of Claims 13 through 24.

27. A receiving apparatus, comprising:

an interface which receives a transmission packet which contains a transmission path header in which additional information is described and data blocks;

transmission path header separator means which separates said transmission packet into said transmission path header and said data blocks;

additional information extracting means which extracts said additional information from said transmission path header;

data packet generating means which generates from said data blocks a data packet which is obtained by combining one or more of said data blocks; and

additional information inserting means which adds or inserts said additional information to said data packet and outputs as an output packet of one type of data format which can be processed by an application simultaneously,

characterized in that said application processes the output packet outputted from said additional information inserting means.

28. The receiving apparatus of Claim 27, characterized in that said data packet is formed by a source packet header and a transport packet in MPEG2 data.

29. The receiving apparatus of Claim 27 or 28, characterized in that said additional information inserting means adds additional information to the beginning or end of said data packet.

30. The receiving apparatus of Claim 28, characterized in that said additional information inserting means inserts said additional information to said source packet header.

31. A receiving apparatus, comprising:

an interface which receives a transmission packet which contains a transmission path header in which additional information is described and data blocks;

transmission path header separator means which separates said transmission packet into said transmission path header and said data blocks;

additional information extracting means which extracts said additional information from said transmission path header;

data packet generating means which generates from said data blocks a data packet which is obtained by combining

one or more of said data blocks;

source packet header separator means which separates said data packet into a source packet header and a source packet; and

additional information inserting means which adds or inserts said additional information to said source packet or replaces said additional information, and outputs as an output packet of one type of data format which can be processed by an application simultaneously,

characterized in that said application processes the output packet outputted from said additional information inserting means.

32. The receiving apparatus of Claim 31, characterized in that said source packet is a transport packet in MPEG2 data.

33. The receiving apparatus of Claim 32, characterized in that said additional information inserting means adds said additional information to the beginning or end of said transport packet.

34. The receiving apparatus of Claim 32, characterized in that said additional information inserting means replaces a sync byte of said transport packet with said additional information.

35. The receiving apparatus of any one of Claims 27 through 34, characterized in that said interface is an

Sub A19

Sub A19 IEEE1394 interface, and said transport packet is an isochronous packet.

36. The receiving apparatus of any one of Claims 27 through 35, characterized in that said additional information is copyright information.

37. The receiving apparatus of any one of Claims 27 through 36, characterized in that said additional information is described in an SY area of an isochronous packet.

38. A data sending apparatus, comprising:

additional information separator means which, upon receipt of an input packet of one type of data format which can be be processed by an application simultaneously, retrieves said additional information which is added or inserted to a data packet which forms said input packet;

data block generating means which generates one or more data blocks from said data packet;

transmission packet generating means which executes predetermined processing on said data blocks, inserts said additional information at a predetermined location in said data blocks, and accordingly generates said transmission packet; and

an interface which sends said transmission packet.

39. The sending apparatus of Claim 38, characterized in that said data packet is formed by a source packet header

and a transport packet in MPEG2 data.

40. The sending apparatus of Claim 38 or 39, characterized in that in said input packet, said additional information is added to the beginning or end of said data packet.

Sub A20 41. The sending apparatus of Claim 39, characterized in that said input packet inserts said additional information to said source packet header.

42. A sending apparatus, comprising:

additional information separator means which, upon receipt of an input packet of one type of data format which can be processed by an application simultaneously, constructs said input packet and retrieves said additional information from a transport packet which includes added, inserted or replaced additional information;

data packet generating means which combines a source packet header with said transport packet to thereby generate a data packet;

data block generating means which generates one or more data blocks from said data packet;

transmission packet generating means which executes predetermined processing on said data blocks, inserts said additional information at a predetermined location in said data blocks, and accordingly generates said transmission packet; and

an interface which outputs said transmission packet.

43. The sending apparatus of Claim 42, characterized in that said input packet is obtained by replacing a sync byte of said transport packet with additional information.

44. The sending apparatus of Claim 42, characterized in that said input packet is obtained by adding said additional information to the beginning or end of said transport packet.

Sub A21
45. The sending apparatus of any one of Claims 38 through 44, characterized in that said interface is an IEEE1394 interface, and said transport packet is an isochronous packet.

46. The sending apparatus of any one of Claims 38 through 45, characterized in that said additional information is copyright information.

47. The sending apparatus of any one of Claims 38 through 46, characterized in that said additional information is described in an SY area of an isochronous packet.

48. A medium which can be read on a computer and which holds a program for making a computer execute all or some of the respective means or the respective structural elements which form the receiving apparatus or the sending apparatus according to any one of Claims 27 through 47.

49. An aggregation of information which is a program

and/or data for making a computer execute all or some functions of all or some means of the invention according to any one of Claims 27 through 47.

- 90 -